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THE UTILISATION AND EXCRETION OF VITAMIN B_1 BY THE DOG

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INTRODUCTION

In a previous investigation carried out in these laboratories (Worden, Waterhouse & Partington, 1952) dogs were maintained in a metabolism cage on standard diets and their urinary levels of vitamin B_1, riboflavine and nicotinic acid were measured. The size of dog in relation to that of the cage, and the temperament of the animal were found to be important factors (see also Worden, 1939). With standard diets, but with unrestricted access to drinking water, there was naturally considerable variation in the volume of urine excreted during a 24-hour period. Since the excretion of these substances when calculated per unit of volume was remarkably consistent, it followed that the 24-hour output, based on volume of urine, fluctuated considerably. It would, therefore, seem preferable to express 24-hour output figures as a fraction of a longer period of study on a dog already adapted to the experimental conditions.

It was decided to extend the observations to dogs maintained on a standard diet and on a known daily water intake. An attempt was made to vary the 24-hour output of urine in each of two ways so that the quantitative effect on vitamin B_1 excretion and utilisation could be measured. The two methods employed were as follows:—

(1) The dog was kept in the cage for 10 to 12 days on a standard diet. For the first four to six days a known standard daily intake of water was allowed, the quantity being significantly less than the animal would consume under the conditions if allowed free access. For the remainder of the period the standard daily allowance was increased to approximately the full amount which the animal would consume voluntarily.

(2) The dog was kept in the cage for 10 to 12 days on a standard diet and a standard daily water intake throughout. The water intake was arranged to be the same as given in the second half of the experiment described in (1) above. For the second half of the period the environmental temperature was significantly increased by the use of convection heaters, and this had the effect of increasing the water loss from the animal's body surfaces by evaporation, with a consequent reduction in the volume of urine.

It was hoped also that, through the use of dogs of differing bodyweights, some data might be obtained on their comparative utilisation of vitamin B_1 under similar experimental conditions.

EXPERIMENTAL

The observations were made on three dogs (two male, one female), the individual details of which are given below. The animals were accommodated in a cage and the samples collected in the manner previously described. For the sake of convenience the identification numbers employed in the earlier study have been retained (Worden *et al.*, 1952).

Vitamin B_1 hydrochloride was estimated by the method of Jowett (1940) modified as previously described, and urea by a modification of the method of Marshall (1913).

Throughout the experiments each dog received a measured quantity of a diet comprising pressure-cooked rabbit meat, wholemeal bread, and milk. The amounts fed are given below, and the vitamin levels were determined each day in a sample from the homogenised mixed diet. The vitamin B_1 of this diet was extracted by the method of Kodicek & Wang (1949) and the determination completed by the method previously described for determination of this vitamin in urine.

RESULTS

Dog No. 4—Scottie, Scottish terrier, male

Age	33 months (1st series)
Weight	19 lb.
General condition—excellent.	
Behaviour during test—excellent.	

1st series: Diet fed per day:

Cooked rabbit meat	8 oz.
Wholemeal bread	6 oz.
Milk	250 ml.
Water for first four days	200 ml.
Water for remaining six days	500 ml.

TABLE I

Dog No. 4—Scottie. *First series*

	Sample collected 24 hours ending:										
Vitamin intake whilst under test:	18.3.53	19.3.53	20.3.53	21.3.53	22.3.53	23.3.53	24.3.53	25.3.53	26.3.53	27.3.53	28.3.53
Aneurine hydrochloride (µg. per g. of diet)	0·33	0·39	0·32	0·35	0·31	0·41	0·30	0·29	0·32	0·34	—
Aneurine hydrochloride (daily intake in µg.)	261	302	254	274	245	322	239	228	248	262	—
Urinary excretion whilst under test:											
Results expressed per ml. of sample											
Aneurine hydrochloride (µg. per ml.)	—	0·50	0·45	0·67	0·46	0·43	*	0·38	0·37	0·31	0·33
Urea (per cent. of sample)	—	5·79	5·40	5·52	4·91	3·30	4·26	5·46	5·11	—	5·80
Specific gravity of sample	—	1·025	1·021	1·035	1·022	1·024	1·022	1·038	1·033	—	1·037
Volume of sample (ml.)	—	180	303	261·4	412	388	440	368	360	370	234
Results expressed as 24-hour output											
Aneurine hydrochloride (µg.)	—	90	136	175	190	167	*	133	133	115	77·4
Urea (grammes)	—	10·43	16·36	14·4	12·84	12·8	18·75	20·1	18·4	—	13·56

* Sample broken in transit.

2nd series : Diet fed per day :
Cooked rabbit meat ... ... 8 oz.
Wholemeal bread ... ... 6 oz.
Milk ... ... 250 ml.
Water for first seven days ... ... 200 ml.
Water for remaining six days ... ... 500 ml.

ml. of urine rose only very slightly at the higher temperatures. The effect of this was that the total daily excretion of vitamin in the reduced urine output was considerably less at higher than at lower temperatures: this will be further commented upon later.

TABLE II

Dog No. 4—Scottie. *Second series*

	Sample collected 24 hours ending :												
Vitamin intake whilst under test :	11.4.53	12.4.53	13.4.53	14.4.53	15.4.53	16.4.53	17.4.53	18.4.53	19.4.53	20.4.53	21.4.53	22.4.53	23.4.53	24.4.53
Aneurine hydrochloride (µg. per g. of diet)	0·18	0·18	0·33	0·29	0·20	0·29	0·21	0·26	0·24	0·23	0·18	0·25	0·22	—
Aneurine hydrochloride (daily intake in µg.)	111	111	256	238	231	231	165	201	189	181	142	197	173	—
Urinary excretion whilst under test :														
Results expressed per ml. of sample														
Aneurine hydrochloride (µg. per ml.)	—	0·46	0·45	0·35	0·38	0·39	0·45	0·37	0·24	0·25	0·26	0·12	0·20	0·21
Urea (per cent. of sample)	—	4·65	5·58	7·18	5·56	5·32	7·55	8·23	4·30	4·50	4·12	4·00	3·98	4·15
Specific gravity of sample	—	1·02	1·036	1·026	1·017	1·021	1·034	1·023	1·049	1·054	1·036	1·008	1·010	1·01
Volume of sample (ml.)	—	186	200	290	365	370	220	268	654	473	395	573	550	421
Results expressed as 24-hour output														
Aneurine hydrochloride (µg.)	—	85·5	90	104	139	144	103	99	157	118	103	126	110	88·5
Urea (grammes)	—	8·65	11·16	20·8	20·3	19·7	17·3	8·65	27·7	19·4	16·3	22·95	21·90	17·45

3rd series : Weight of dog at commencement of test ... 19 lb.
" " " end " " ... 21 lb.
Diet fed per day :
Cooked rabbit meat ... ... 8 oz.
Wholemeal bread ... ... 6 oz.
Milk... ... ... 250 ml.
Water allowed per day throughout test ... 500 ml.

In the third series the urinary output for the first two days was exceptionally high, due probably to the fact that in the warm weather and on free run the dog had been drinking large amounts of water in the days before going into the cage.

TABLE III

Dog No. 4—Scottie. *Third series*

	Sample collected 24 hours ending :										
Vitamin intake whilst under test :	8.6.53	9.6.53	10.6.53	11.6.53	12.6.53	13.6.53	14.6.53	15.6.53	16.6.53	17.6.53	18.6.53
Aneurine hydrochloride (µg. per g. of diet)	0·40	0·22	0·17	0·39	0·30	0·30	0·30	0·28	0·29	0·29	—
Aneurine hydrochloride (daily intake in µg.)	320	175	135	310	239	239	239	223	231	231	—
Urinary excretion whilst under test :											
Results expressed per ml. of sample											
Aneurine hydrochloride (µg. per ml.)	—	0·29	0·31	0·27	0·37	0·32	0·25	0·41	0·31	0·19	0·39
Urea (per cent. of sample)	—	1·98	2·62	3·075	3·74	3·59	3·61	4·02	5·33	6·35	8·02
Specific gravity of sample	—	1·000	1·000	1·005	0·999	1·000	1·023	1·031	1·033	1·036	1·044
Volume of sample (ml.)	—	730	780	520	668	596	532	360	382	232	272
Results expressed as 24-hour output											
Aneurine hydrochloride (µg.)	—	212	242	141	247	190	133	147·5	118·2	114	106
Urea (grammes)	—	14·50	19·00	16·00	25·00	21·40	19·20	17·70	20·50	15·40	21·50
Temperature in metabolism cage (24-hour readings) :											
Minimum thermometer	56°	57°	61°	60°	60°	70°	77°	79°	80°	84°	76°
Maximum thermometer	62°	64°	68°	60°	62°	76°	78°	102°	92°	96°	94°

Dog No. 4—Scottie. Notes

The general condition and behaviour of the dog during test was excellent, even during the latter part of the third series when the environmental temperature was considerably raised. He was bright and quite active in the cage—in which he had room to run and jump about—and in this respect his behaviour differed markedly from that of Dog No. 1, " Pat."

In the first and second series the increase in urine volume from the day or two following administration of greater volume of water was noticeable, although it is clear that even on controlled daily intake there was still a considerable fluctuation in urine volume. Under these conditions there was a fall in the urinary excretory level of vitamin B_1 when more water was allowed with the result that, in spite of the increased volume of urine passed, the daily excretion of vitamin B_1 remained relatively unaffected.

In the third series it is interesting to note the profound effect of increased environmental temperature. An increase of approximately 30° F. caused the urine volume to drop to about one-third, the remaining 500 ml. being presumably lost by increased evaporation from the body surfaces. In this series the excretory level of vitamin B_1 per

Dog No. 1—Pat, mongrel, smooth-coated, male
Age ... ... 4 years
General condition—excellent.
Behaviour during test—excellent.

1st series : Weight of dog at commencement of test ... 54 lb.
" " " end " " ... 49 lb.
Diet fed per day :
Cooked rabbit meat ... ... 8 oz.
Wholemeal bread ... ... 6 oz.
Milk... ... ... 250 ml.
Water for first six days ... ... 200 ml.
Water for remaining six days ... ... 500 ml.

2nd series : Weight of dog at commencement of test ... 52 lb.
" " " end " " ... 47 lb.
Diet fed per day :
Cooked rabbit meat ... ... 8 oz.
Wholemeal bread ... ... 6 oz.
Milk... ... ... 250 ml.
Water allowed per day throughout test ... 500 ml.

3rd series : Weight of dog at commencement of test ... 49 lb.
" " " end " " ... 50 lb.
Diet fed per day :
Cooked rabbit meat ... ... 8 oz.
Wholemeal bread ... ... 6 oz.
Milk... ... ... 250 ml.
Water allowed per day throughout test ... 750 ml.

TABLE IV

Dog No. 1—Pat. *First series*

	Sample collected 24 hours ending :												
Vitamin intake whilst under test :	25.4.53	26.4.53	27.4.53	28.4.53	29.4.53	30.4.53	1.5.53	2.5.53	3.5.53	4.5.53	5.5.53	6.5.53	7.5.53
Aneurine hydrochloride (μg. per g. of diet)	0·22	0·26	0·24	0·22	0·22	0·25	0·22	0·27	0·22	0·25	0·23	0·20	—
Aneurine hydrochloride (daily intake in μg.)	173	204	189	173	173	196·5	173	212	173	196·5	181	157·5	—
Urinary excretion whilst under test :													
Results expressed per ml. of sample													
Aneurine hydrochloride (μg. per ml.)	—	0·39	0·39	0·33	0·30	0·36	0·35	0·25	0·19	0·27	0·19	0·21	0·21
Urea (per cent. of sample)	—	4·83	6·24	—	4·68	6·09	7·67	4·09	3·22	4·87	3·34	3·82	4·21
Specific gravity of sample	—	1·028	1·026	1·029	1·028	1·014	1·042	1·026	1·018	1·036	1·019	1·022	1·021
Volume of sample (ml.)	—	546	396	542	542	280	382	440	706	312*	732	570	605
Results expressed as 24-hour output													
Aneurine hydrochloride (μg.)	—	213	155	179	162·5	99·5	134	110	130	82·7*	142	120	127
Urea (grammes)	—	26·37	24·71	—	25·37	17·05	29·30	18·00	22·73	15·19*	24·45	21·77	25·47

* Some urine lost due to the dog escaping from metabolism cage.

TABLE V

Dog No. 1—Pat. *Second series*

	Sample collected 24 hours ending :										
Vitamin intake whilst under test :	24.6.53	25.6.53	26.6.53	27.6.53	28.6.53	29.6.53	30.6.53	1.7.53	2.7.53	3.7.53	4.7.53	5.7.53
Aneurine hydrochloride (μg. per g. of diet)	0·29	0·33	0·43	0·33	0·31	0·28	0·31	0·32	0·32	0·25	0·30	—
Aneurine hydrochloride (daily intake in μg.)	231	260	338	263	246	223	246	254	254	200	239	—
Urinary excretion whilst under test :												
Results expressed per ml. of sample												
Aneurine hydrochloride (μg. per ml.)	—	0·27	0·32	0·38	0·31	0·24	0·34	0·33	*	0·55	0·50	0·53
Urea (per cent. of sample)	—	0·508	3·21	4·07	3·81	3·49	4·98	4·83	*	7·89	10·07	7·45
Specific gravity of sample	—	1·003	1·000	1·009	1·001	1·007	1·012	1·009	*	1·029	1·031	1·041
Volume of sample (ml.)	—	910	866	484	755	722	379	542	*	255	214	215
Results expressed as 24-hour output												
Aneurine hydrochloride (μg.)	—	246	277	184	234	173	129	179	*	140	107	114
Urea (grammes)	—	4·62	27·80	19·70	28·80	25·20	18·90	26·20	*	20·05	21·50	16·00
Temperature in metabolism cage (24-hour readings) :												
Minimum thermometer	66°	66°	70°	68°	64°	64°	78°	82°	83°	84°	83°	88°
Maximum thermometer	70°	76°	77°	76°	75°	70°	84°	86°	89°	90°	90°	90°

* No sample available due to dog escaping from metabolism cage.

TABLE VI

Dog No. 1—Pat. *Third series*

	Sample collected 24 hours ending :										
Vitamin intake whilst under test :	9.9.53	10.9.53	11.9.53	12.9.53	13.9.53	14.9.53	15.9.53	16.9.53	17.9.53	18.9.53	19.9.53
Aneurine hydrochloride (μg. per g. of diet)	0·27	0·26	0·31	0·30	0·26	0·27	0·31	0·27	0·25	0·28	—
Aneurine hydrochloride (daily intake in μg.)	215	207	244	236	204	212	244	280	196·6	220	—
Urinary excretion whilst under test :											
Results expressed per ml. of sample											
Aneurine hydrochloride (μg. per ml.)	—	0·19	0·25	0·19	0·22	0·17	0·23	0·22	0·22	0·15	0·23
Urea (per cent. of sample)	—	2·46	2·31	2·76	2·57	2·01	3·06	3·44	3·58	2·98	3·29
Specific gravity of sample	—	1·022	1·022	1·020	1·020	1·017	1·018	1·022	1·023	1·019	1·028
Volume of sample (ml.)	—	680*	1,060	850	990	824	517	680	520	826	600
Results expressed as 24-hour output											
Aneurine hydrochloride (μg.)	—	129	265	161·5	218	140	119	149	114	124	138
Urea (grammes)	—	16·72	24·42	23·40	25·20	16·55	15·80	23·35	18·62	24·60	19·70
Temperature in metabolism cage (24-hour readings) :											
Minimum thermometer	64°	64°	54°	62°	54°	54°	78°	83°	81°	78°	78°
Maximum thermometer	74°	74°	62°	62°	68°	68°	82°	84°	85°	86°	86°

* Reduced volume—dog escaped from metabolism cage.

Dog No. 1—Pat. Notes

This dog was a most useful subject to use as a contrast to Dog No. 4, "Scottie." He was a much more placid animal and his behaviour in the cage differed considerably. Although he appeared quite happy—tending to lie down for long periods in a "contemplative" mood and frisking about very little—this was not by any means due entirely to his greater size in relation to the cage. Although this dog was more than twice the weight of Dog No. 4, it is most interesting to note the following results:—

(*a*) Pat required only the same weight of diet per day as Scottie to satisfy him.

(*b*) Although Pat was more than twice the bodyweight of Scottie, his vitamin B_1 excretion per day was as high, if not higher, indicating a greatly reduced utilisation of the vitamin per unit of bodyweight.

The effects observed on vitamin B_1 excretion as a result in the first series of increasing the water intake and in the second series of raising the environmental temperature, were similar to those observed in the case of Dog No. 4, "Scottie."

Dog No. 7—Roxy, spaniel, liver and white, bitch

Age ... ... 6 years
General condition—excellent.
Behaviour during test—excellent.

1st series : Weight of dog at commencement of test ... 32 lb.
" " " end " " ... 27 lb.
Diet fed per day :
Cooked rabbit meat ... ... 6 oz.
Wholemeal bread ... ... 4½ oz.
Milk... ... ...187·5 ml.
Water allowed per day throughout test ... 500 ml.

TABLE VII

Dog No. 7—Roxy

	Sample collected 24 hours ending :									
Vitamin intake whilst under test :	16.7.53	17.7.53	18.7.53	19.7.53	20.7.53	21.7.53	22.7.53	23.7.53	24.7.53	25.7.53	26.7.53
Aneurine hydrochloride (μg. per g. of diet)	0·32	0·30	0·32	0·36	0·32	0·34	0·35	0·26	0·28	0·31	—
Aneurine hydrochloride (daily intake in μg.)	192	179	191·5	216	191·5	203	210	156	168	186	—
Urinary excretion whilst under test :											
Results expressed per ml. of sample											
Aneurine hydrochloride (μg. per ml.)	—	0·25	0·12	0·24	0·23	0·18	0·20	0·24	0·22	0·23	0·40
Urea (per cent. of sample)	—	3·28	2·55	3·57	3·65	3·50	4·97	5·72	5·96	6·30	9·92
Specific gravity of sample	—	1·025	1·008	1·022	1·018	1·020	1·035	1·034	1·035	1·035	1·049
Volume of sample (ml.)	—	656	668	666	254	608	116	250	280	256	170
Results expressed as 24-hour output											
Aneurine hydrochloride (μg.)	—	164	80	160	58·5	109	23·2	60	61·5	58·9	68·0
Urea (grammes)	—	21·40	17·05	23·80	9·25	21·20	5·75	14·30	16·70	16·35	16·85
Temperature in metabolism cage (24-hour readings) :											
Minimum thermometer	64°	68°	60°	60°	68°	68°	80°	86°	84°	88°	88°
Maximum thermometer	88°	70°	70°	72°	72°	70°	87°	88°	90°	90°	90°

Dog No. 7—Roxy. Notes

There are some interesting factors in connection with the vitamin B_1 excretion levels of this animal:—

(*a*) The concentration of vitamin in the urine expressed as μg. per ml. was remarkably constant in spite of considerable variations in the volume of urine excreted, especially at the lower temperatures of the first six days. The total daily excretion tended, therefore, to fluctuate in a manner similar to that recorded in the previous paper (Worden *et al.*, 1952) when the tests were carried out with unrestricted access to water.

(*b*) The effect of increased environmental temperature in causing a substantial drop in urine output with a corresponding drop in daily vitamin excretion was similar to that observed in the other dogs under test.

(*c*) This animal, although 15 lb. lighter in weight, had a daily aneurine excretion lower than that recorded for Dog No. 1, "Pat." This, however, was in part accounted for by the fact that the intake was reduced to 75 per cent. of that of the other two animals. "Roxy" could not be persuaded to consume voluntarily the quantity of food used for the other two, having normally a smaller appetite.

In Table VIII the results quoted in the previous seven tables are summarised and the average daily output under the various conditions of test is expressed as a percentage of the average daily intake. It will be seen that in five out of the six tests, Dog No. 4, "Scottie," excreted a little over half the ingested vitamin B_1. Dog No. 1, "Pat," however, although twice the weight, excreted a higher percentage of the daily intake than Dog No. 4 on a similar average daily intake.

Dog No. 4, "Scottie," does, however, show an average output of 87·5 per cent. of the intake in Series 3 at a low environmental temperature. In this experiment, therefore, he excreted a quantity comparable with that excreted by Dog No. 1, but, being half the bodyweight, he still utilised much more per lb. bodyweight. In this instance it is important to note that for the third series of tests Dog No. 4 was transferred to an alternative room where suitable heating arrangements were installed. For the previous tests he had been in a laboratory, with plenty of human company. All the workers made the observation that this affected his behaviour: he became much less lively and in manner tended to resemble Dog No. 1. This may well account for a drop in the average daily utilisation of aneurine.

It will be seen in the earlier Tables I to VII that occasionally the 24-hour output figure exceeded the 24-hour intake figure for vitamin B_1. This occurred on individual days only and the average figure for the four or five days concerned always showed a satisfactory excess of intake over output. It has already been stressed in this and in the

TABLE VIII

ANEURINE HYDROCHLORIDE (VITAMIN B_1) INTAKE AND OUTPUT PER 24 HOURS

	Series No.	Effect of variation of water intake: First days of experiment at 200 ml. per day			Effect of variation of water intake: Last days of experiment at 500 ml. per day			Temperature effect (with 500 ml. water intake throughout): Low environmental temperature			Temperature effect (with 500 ml. water intake throughout): High environmental temperature		
		Intake	Output	Per cent.	Intake	Output	Per cent.	Intake	Output	Per cent.	Intake	Output	Per cent.
Dog No. 4 Scottie (weight 19 lb.)	1	273μg. S.D. ±21·2	148μg. S.D. ±44·7	54·0	244μg. S.D. ±12·47	125μg. S.D. ±32·8	51·5						
	2	201μg. S.D. ±48·3	109μg. S.D. ±23·2	54·0	181μg. S.D. ±22·0	117μg. S.D. ±23·4	64·5						
	3							236μg. S.D. ±81·3	206μg. S.D. ±43·3	87·5	233μg. S.D. ±6·7	124μg. S.D. ±16·5	53·5
Dog No. 1 Pat (weight 54 lb.)	1	185μg. S.D. ±13·8	157μg. S.D. ±38·8	85·0	184μg. S.D. ±21·1	126μg. S.D. ±11·9	68·5						
	2	268μg. S.D. ±41·3	223μg. S.D. ±43·5	83·5	232μg. S.D. ±21·4	134μg. S.D. ±28·4	58·0						
	3							223μg. S.D. ±20·2	196μg. S.D. ±56·5	88·0	231μg. S.D. ±32·4	129μg. S.D. ±14·6	56·0
Dog No. 7 Roxy (weight 32 lb.)	1							194μg. S.D. ±13·5	118μg. S.D. ±47·3	61·0	185μg. S.D. ±22·8	54μg. S.D. ±17·8	29·0

previous paper (Worden, Waterhouse & Partington, 1952) that the figure for 24-hour urinary vitamin B_1 output should preferably, in any case, be related to periods of longer than 24 hours in order to yield consistent results. It will be noted also that the occasional case of apparent negative vitamin B_1 balance always occurred in the first two or three days of an experiment and this may, therefore, in part be related to the fact that the animal had, prior to the test, been on a free diet of, probably, variable vitamin content.

Discussion

These experiments are a continuation of those previously reported and were carried out primarily to establish excretory levels of vitamin B_1 for the dogs under a variety of conditions.

In previous experiments, on unrestricted water intake, the daily urine volume had shown considerable fluctuation, with a corresponding fluctuation in 24-hour vitamin output. In an attempt to control this the animals were placed on a standard diet and in addition a known, standard, daily water intake. In three experiments the animals were allowed for the first few days a quantity of water rather less than their normal capacity on free access. This was followed for the remaining days of the test by a daily quantity judged to be the maximum the animal would take voluntarily. This had, in fact, the expected effect and both Dogs 1 (" Pat ") and 4 (" Scottie "), on which this experiment was carried out, showed a marked decrease in urinary vitamin B_1 concentration when the water intake was increased, so that the *per diem* output remained of the same order.

It was then decided to carry out experiments in which the water intake was held constant at the higher of two previous levels, but the urinary output was significantly altered by other means. It was found possible to reduce the urine output to only one-third of its previous figure by increasing the environmental temperature by some 30° F., the remaining water being lost presumably by evaporation from the body surfaces. Under these conditions the concentration (μg. per ml.) of vitamin in the urine rose perceptibly in Dogs 1 (" Pat ") and 4 (" Scottie ") but not by any means enough to maintain the daily output figures established at the lower temperature. In Dog No. 7 (" Roxy ") the concentration did not rise significantly so that the daily output figures at the higher temperatures were little over half those at the lower temperatures.

Whilst still using a normal water intake, but by artificially reducing urine output in this manner, it was shown to be possible to reduce significantly the daily loss of vitamin B_1. This would seem to be in accord with the observations of Cowgill, Rosenberg & Rogoff (1930), who found that, by the forcible administration of large amounts of fluid by mouth to dogs on a diet relatively free from undifferentiated vitamin B, it was possible to shorten considerably the time required to produce an anorexia characteristic of lack of vitamin B. This was presumably due to the production, albeit under abnormal conditions of water intake, of the opposite effect to that now found, *i.e.*, an abnormally high urinary output with a correspondingly high daily loss of vitamin. Cowgill *et al.* regarded this as the possible explanation and suggested also that the voluntary restriction of fluid intake on a vitamin B-deficient regime would be in the nature of a protective reaction. In the animals on a normal water intake studied by us, protection against vitamin B_1 loss has presumably been afforded by eliminating the ingested water by routes other than the urine. Under practical conditions it is possible that a dog may restore the balance by consuming more water when the temperature rises and thereby maintain the urine volume.

In this connection, however, particularly when experiments are being carried out at raised environmental temperatures, consideration must be given to the possible loss of vitamin B_1 in sweat, and, in the case of the dog, in other forms of insensible water loss. Although Tennant & Silber (1943) were unable to confirm the presence of appreciable quantities of vitamin B_1 in normal human sweat, whether produced thermally or by exercise, workers at Nagoya University (see Chemical Abstracts, American Chemical Society, 1952) were able to demonstrate it in both sweat and saliva. Hardt & Still (1941) had earlier shown that the injection of vitamin B_1 hydrochloride into human subjects led to the excretion of even greater quantities in the sweat than in the urine. Despite differences in the distribution and activity of sweat glands in the dog (Eimer, 1926; Aoki & Wada, 1951), as compared with man and other species with well-developed sweating mechanisms, there is a comparable overall loss of water from this and other non-urinary routes (see Dukes, 1943, p. 397), and it is reasonable to assume that these could form a channel of excretion for the vitamin.

It is interesting to consider another aspect of the results obtained. Dog No. 4 (" Scottie "), weight 19 lb., required the same amount of food *per diem* as Dog No. 1 (" Pat "), weight 52 to 54 lb., and both appeared to be satisfied. The Scottish Terrier as a breed has a good appetite, and in these experiments " Scottie " was receiving over twice as much aneurine per lb. bodyweight as the larger dog. By contrast he was, on an average, excreting even less vitamin B_1 than the larger animal, and must presumably have been utilising almost twice as much per unit of bodyweight. It has already been mentioned that " Scottie " was alert and active in the cage and naturally had more room in which to move about. Dog No. 1, " Pat," on the other hand, was much quieter and more reposeful, although apparently still quite at ease. In a further paper Cowgill *et al.* (1931) found that in dogs under conditions of forced exercise the period required for the development of the anorexia was markedly reduced. They considered that this finding supported the view that " the vitamin B requirement per unit of tissue mass is proportional to the metabolism of that mass."

It is now known from the work of Arnold & Elvehjem (1939) that the vitamin B_1 requirement of the dog is governed by the amount of non-fat calories metabolised rather than by the dog's weight alone. In the present investigation, since both " Scottie" and " Pat " obtained similar quantities of a standard diet, this factor may be largely eliminated.

Mickelsen, Caster & Keys (1946) have shown that there may be very considerable variations in the urinary excretion of vitamin B_1 among individual young men receiving a controlled intake of this vitamin, and a similar individual variation is apparent in the dogs we have studied.

Summary

1. Three dogs of varying breed, sex, and bodyweight have been maintained in a metabolism cage and provided with standard diets and standard water intake, and their urinary excretion of vitamin B_1 has been measured.

2. It has been found that on similar diets the excretion of vitamin B_1 is not proportional to bodyweight. An

alert and active dog of 19 lb. weight was found to excrete less vitamin B_1 in the urine than a more lethargic animal of 52 to 54 lb. bodyweight.

3. The effect of increasing the environmental temperature by approximately 30° F. with each of the dogs when on a standard diet and water intake has been studied. It has been found that under these conditions the urine volume decreases to approximately one-third, and that although the vitamin B_1 concentration in the reduced urine volume is greater, there is a significant drop in the daily urinary excretion of the vitamin.

Acknowledgments.—We are grateful to Dr. E. Kodicek, of the Dunn Nutritional Laboratory, Cambridge, for his valuable suggestions regarding these experiments and their interpretation, and to our colleague Mr. J. Bunyan for assistance with certain aspects. We are indebted also to Miss M. Hardaker and Mr. M. J. Rix for some of the analyses and for care of the experimental animals.

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CLINICAL TRIALS WITH ACTH

BY

W. J. JORDAN,

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Introduction

Relatively few studies have been made on the therapeutic value of ACTH in veterinary medicine, though in 1948-49 Hench & Kendall first demonstrated its outstanding value in polyarthritis in man. Shaw *et al.* (1951) used ACTH on two cases of acetonaemia with good results, and since then further work has been done in the U.S.A. However, persistent work has been carried on in all countries to determine its physiological and chemical nature, and the changes associated with the parenteral administration of ACTH are fairly well known. They have been summarised so far as the domestic animals are concerned by Martin (1953). Among the most important of these are increased glucogenesis, increased catabolism of protein, stimulation of the antibody response, but inhibition of inflammatory reaction.

Experimental

Observations were made on 28 consecutive cases of acetonaemia occurring from the beginning of February until the end of the seasonal incidence. These cases occurred in an intensively farmed dairy district with high average milk yields. The breeds concerned were predominating Ayrshire and Friesian; but Guernsey, Jersey, Red Poll and Shorthorn were also represented. In the trial only the type of ketosis occurring three weeks and more after calving was considered. The puerperal type which occurs a few days to two weeks after calving was not included. In all cases milk samples were tested with the modified Rothera's test and the intensity of colour change noted. The clinical picture varied from a drop in milk yield and loss of appetite for concentrates, to that of the characteristic and severe case associated with constipation or diarrhoea, salivation and staggering.

Observation

The hormone was given intramuscularly in a dose of 50 mg. in sterile distilled water. A slight local inflammatory reaction appeared on the day following the injection. Many animals refused to eat and little or no improvement was noted. But by the second day appetite had returned to normal, and milk yield was sharply increased though not quite back to the level just prior to the illness. The cow lost the dull, sleepy appearance, and in most cases could not be picked out as abnormal. The reaction to the modified Rothera's test was greatly reduced, and in some cases, depending on the initial intensity, absent.

When first visited 11 animals were treated with ACTH alone. Seven of these had recovered by the second day. Four were given a second injection and all recovered uneventfully. Seventeen animals when first visited received the usual treatment of injections of glucose 4 oz., vitamin A 20,000 I.U., vitamin B_{12} 200 µg. and stomachics by mouth; and only one had returned to near normal by the second day. Six animals had improved, and recovered after second injection of the usual treatment. Ten cows were given ACTH because response to other treatment was poor to nil, and all had recovered two days later.

No undesirable reaction, apart from inappetence on the day following injection, was noticed. None of the animals, of course, had yet been served subsequent to calving. Subsequent history has not revealed any undesirable reaction. The use of ACTH seems quite safe and reliable.

Summary

In this clinical trial it was found that ACTH is a distinct improvement on all foregoing treatment for ketosis. Not only was it successful in bringing the animal back to health, but it did so in a relatively short time thus reducing considerably the loss in bodily condition and milk yield.

Acknowledgment.—I am indebted to Consolidated Chemicals Ltd., Wrexham, for the supplies of ACTH used in this trial.

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Addendum.—This season 77 further cases of ketosis have been treated with ACTH and five of these were treated after normal medicaments had failed. Only two cases required a second dose. ACTH has also been used for pregnancy toxaemia in three sheep with marked success. The dose was 20 mg.

SWARM OF DWARF LOCUSTS

It was reported from Kampala on Monday, March 8th, that the largest swarm of dwarf locusts ever seen in Uganda was concentrated west of Masaka. At least 10 miles across, it blotted out the daylight and hung like fog 8 feet from the ground. Fortunately, this variety of locust is unlikely to cause famine.

THE VETERINARY RECORD
March 20th, 1954

ANIMAL DISEASE AND MEAT INSPECTION

WE publish in the adjoining column an abstract from an article dealing with losses caused by the liver fluke in Sweden. The estimated losses are based on accurate statistics compiled at six abattoirs in the Provinces concerned; and the article well illustrates the immense value of properly kept records of diseases discovered at the slaughterhouse.

We have long held the view that such records should be available in this country in respect of all livestock diseases; but up to the present, little or no attempt has been made to ensure that reliable statistics are available. This is particularly the case in respect of the less spectacular, but nevertheless costly, diseases. Without accurate knowledge of the incidence of any particular disease, or its distribution throughout the country, effective control measures are difficult to apply. Accurate knowledge of the financial loss sustained in connection with the less spectacular diseases, some of which are preventable, would give added emphasis to the urgent need for the immediate application of control measures.

It is difficult to see how a country's meat inspection service can be so organised as to make available this most essential information, without a measure of veterinary control. In making this statement we cast no reflection on those at present responsible for the inspection of meat, the majority of whom are doing excellent work, often under most difficult conditions. We suggest, however, that many of them would welcome effective co-ordination of the existing services.

In the controversy which followed the Past-President's statement on meat inspection made in Aberdeen last year, it was suggested that the veterinary profession would be well advised to leave meat inspection alone, and concentrate on the task of dealing with animal diseases. One correspondent commented that there was ample evidence in the slaughterhouses to emphasise the profession's shortcomings in this direction. We gladly accept the challenge. We fully realise that serious losses are still occurring from disease which could, and should, be prevented. But we deplore the fact that we are working under a great handicap, in that no attempt is being made to correlate and make available the valuable information regarding animal disease which is disclosed in the slaughterhouses of this country.

In the words of the Past-President, "On animal health grounds alone, the control of meat inspection by the profession is long overdue."

ABSTRACTS

Liver Fluke in Sweden*

An account is given of an investigation in Ostergötland province. In the area covered by the Association there exist full statistics about all cattle whose livers were affected with liver flukes to an extent sufficient to cause condemnation of 1 kg. or more. These statistics have been used to provide an estimate of the loss from liver fluke in 18,927 cattle slaughtered in 1952. The material has been worked over in such a way as to divide the cattle into two groups —those affected with liver fluke damage and those not affected. The tables show further details.

Table I

Fluke-Infested Cattle in Per Cent. of the Total Number Slaughtered

Abattoir	Cows	Young Cattle	Young Bulls	Bulls	Total
Linköping	7·9	3·0	—	4·2	6·6
Motala	5·9	1·5	—	5·9	4·6
Tranås	24·9	3·6	3·2	5·7	17·9
Kisa	72·1	25·9	3·8	27·0	60·0
Vimmerby	60·5	21·5	8·2	11·4	50·2
Västervik	39·7	10·3	7·1	6·9	33·5
Average	27·5	7·3	2·2	8·3	21·8

This table shows the varied incidence according to district and class of cattle. The management system for cattle is concerned in these differences.

Table II

Bodyweight Loss of Infested Cows

Abattoir	Average weight		Difference	No. infested cattle	Weight loss in kg.
	Uninfested	Infested			
Linköping	237·6	227·1	10·5	325	3,413
Motala	244·8	231·2	13·6	127	1,727
Tranås	217·0	200·1	16·9	719	12,151
Kisa	223·0	212·0	11·0	849	9,339
Vimmerby	210·5	197·7	12·8	1,225	15,680
Västervik	222·7	206·2	16·5	550	9,075
Total	—	—	13·5	3,795	51,385

Table III shows figures relating to the reduction in meat quality as a result of fluke infestation, in terms of four quality classes. Figures are also given for uninfested cattle.

Table IV is a further development on this theme including an estimate of monetary loss caused by the reduction in meat quality. The total figure here is an estimate and a loss of 208,684 kg. of a value of close on 46,000 kronor.

The summary of the above evidence gives the following estimate of total loss from liver fluke:—

		kronor
Loss of value of condemned liver	15,385 kg. at 5½ kronor	= 85,000
Loss of carcase weight ...	51,000 kg. at 4 kronor	= 204,000
Loss on account of worsening of quality		= 46,000
		335,000

This loss divided between 3,795 cattle represents a loss of 88 kronor per head.

* **Leverflundran – en dyrbar parasit. [The Liver Fluke—A Costly Parasite].** Sallnas, T. (Director of Ostergötlands Abattoir Association, Linköping.) 1953. Lantmannen, Nr. 43.

The Abattoir Association handles 75 per cent. of all cattle slaughtered in the province. If the fluke situation is the same throughout the province, the total estimated loss in 1952 must have been about 450,000 kronor.

In addition to the loss of carcase material, liver flukes also cause a loss of condition and a reduction in milk yield. No estimates are available as to the extent of such loss, though the fact of its occurrence is obvious. If the above findings hold good also for the whole of Sweden, in which some 300,000 cows were " inspected " in 1952, the total loss reckoned at 88 kronor per animal comes to 2,700,000 kronor (if 10 per cent. of the cattle are infested with fluke). This is regarded as a low estimate.

Finally, the Association is trying to attack the liver fluke problem by treating cattle with hexachloroethane, by killing snails with copper sulphate, or by a combination of these methods.

Note.—£1 is approximately equal to 14·5 kronor.

* * * * *

Private Practice in America*

This is a general review of practice in the U.S.A. from which it would appear that development has, except in minor details, taken very much the same course as in the British Isles. The importance of veterinary medicine to the livestock industry was probably appreciated somewhat later than in this country, a great stimulus being provided by the arrival of several graduates from European veterinary schools about the end of the nineteenth century.

The decrease in horse population after the first world war also had its repercussion in America, but the profession was not slow in turning its attention to the food-producing animals, and from then on, great advances have been made in the field of veterinary science and the adjustment of veterinary practice.

Of the 10,000 private practitioners in America, over half are in mixed practice, 20 per cent. confine their work exclusively to the larger animals, 10 per cent. handle small animals only, 6 per cent. specialise in bovine sterility, equine, porcine or poultry practice.

Graduates have to pass the board examination of their own State before being allowed to practise.

The problems of transport appear to be much the same as in this country, and whilst most areas are easily accessible, the mountainous terrain or the occurrence of heavy winter snows create difficulties in other localities. A few practitioners in the west possess private aeroplanes. Practice is highly competitive, and there is as yet little tendency towards " socialisation." Incomes which have risen alongside the rise in stock prices compare favourably with those of the medical profession. The profession in general has benefited by world-wide research which has resulted in an improvement in the quality and application of anaesthetics, the discovery of the sulfonamides, the antibiotics, etc. For a practitioner to compound his own drugs will soon be a thing of the past.

The efforts of the A.V.M.A. in attempting to improve standards of veterinary hospitals are to be applauded. Whilst there are already many for the smaller animals, there are only a few satisfactory ones for the larger animals, though, of course, there are only limited areas where the establishment of the latter would be justified.

Whilst not so long ago venerated and respected as a " horse doctor," public relations have so changed with the improvement of stock management and breeding, and the closer integration of food production with animal health, that the veterinarian is now steadily achieving a higher place in the social hierarchy.

The article concludes with a timely word of warning against relying too much upon laboratory diagnosis and " wonder drugs," with the consequent loss of the faculties which characterise the clinician and physician.

N. S. B.

* **Private Veterinary Practice in America.** Hopkins, D. (1953). *Proc. Pt. I. Int. Vet. Congr., Stockholm.* **2.** 1099–1103.

CLINICAL COMMUNICATION

REMOVAL OF A PAPILLOMA FROM THE BLADDER OF A DOG FOLLOWING INTRAVENOUS PYELOGRAPH

ELSPETH R. PARKER,
Penzance

Subject.—Twelve-and-a-half-year-old wire haired terrier dog.

History.—This dog had been attended in the past when suffering from prostatic hypertrophy and impaction with bone. In October, 1953, he was brought in suffering from slight haematuria; he was unable to go through the night without passing urine. This had been going on for a rather indefinite period. One week later when re-examined prior to X-ray, something could be palpated in the bladder. He was now passing very small quantities of urine at very frequent intervals. The general condition of the dog was unimpaired. Tentative diagnosis of a growth in the bladder was made.

These radiographs showed nothing. This fact, coupled with the excellent appetite and spirit of the dog made it difficult to convince the owner of the seriousness of the situation. A few days later a further series of radiographs were taken following the intravenous injection of 12 c.c. of Pyelosil 35 per cent. w/v (Glaxo). The first picture, taken seven minutes after injection, showed the pelvis of each kidney and the first inch or so of each ureter. Further pictures taken at 20 and about 25 minutes after injection showed—in the dorsal position—a good outline of the bladder and the complete track of the ureters, and in the lateral and oblique positions an excellent picture of a large papilloma occupying almost the entire bladder. A thin layer of the contrast medium could be seen all round the growth except in one position where the peduncle of the growth was attached to the dorsal wall of the bladder.

Six days later cystotomy was performed, and the growth removed under intravenous nembutal anaesthesia.

No urine was passed for at least 12 hours after the operation, and from then on urine which both in quantity and quality appeared normal was passed, though only when the dog was taken out.

This case is recorded for several reasons, namely:—

(1) The fact that a growth which left next to no space in the bladder for urine to accumulate did not upset the dog systemically.

(2) In spite of the fact that he had lost the habit of being clean in the house, immediately after the operation the dog reverted to his normal clean habits.

(3) While it would undoubtedly have been perfectly possible to operate following palpation of the bladder alone, the intravenous pyelograph made it possible to make the

ELSPETH R. PARKER—REMOVAL OF A PAPILLOMA FROM THE BLADDER OF A DOG FOLLOWING INTRAVENOUS PYELOGRAPH

This X-ray film shows the lateral view of the bladder approximately 25 minutes after the injection of Pyelosil. The attachment of the growth may be seen (arrowed) where the thin layer of the contrast medium inside the bladder wall is interrupted.

incision in the easiest position to get at the attachment of the growth. I felt able to give the owner a much more favourable prognosis, and in fact persuade him to let me operate rather than destroy the dog. I started the job much more confidently, knowing more or less what I was going to find. It remains to be seen how soon the growth recurs!

My thanks are due to Dr. Palmer and his staff of the X-ray Department of the West Cornwall Hospital for their interest and co-operation in this and many other cases.

REPORT

Report of the Health of Animals Division, Department of Agriculture, Canada, for the year ended March 31st, 1953

This report is submitted by Dr. T. Childs, Veterinary Director-General, through the Director, Production Service, to the Minister of Agriculture, and it commences by pointing out that during 1953 the Division had a particularly onerous task in dealing with that scourge of livestock, foot-and-mouth disease, and a rather widespread outbreak of rabies.

Foot-and-mouth disease was eradicated in record time, while measures taken to control, and if possible eradicate, rabies also promise to be successful.

It is the responsibility of the Health of Animals Division, under the authority of the Animal Contagious Diseases Act, to prevent the introduction of serious animal diseases from outside sources, and under the authority of the Meat and Canned Foods Act to supervise the operations of all packing plants, slaughtering premises, and cold storage establishments in Canada. Supervision includes *ante-mortem* and *post-mortem* veterinary inspection of all meat food animals, and carcases intended for food purposes or for processing.

In connection with the outbreak of foot-and-mouth disease, it is pointed out that a disturbingly large percentage of immigrants into Canada include meats and meat products in their baggage, and that these products are more likely to carry the virus of foot-and-mouth disease than any other product or material. To prevent such dangerous materials from being transported to Canada, it is stated that all possible precautions have been taken, including fumigation or sterilisation of clothing, packing material, and personal effects of people going to Canada from infected areas.

The situation in respect of Newcastle disease is stated to have improved greatly during the year. The extensive use of a live virus vaccine derived from a mild type of virus is said to have proved a most satisfactory protective procedure.

Rabies appeared on a wide front among predatory animals in the North-West Territories and the northern parts of the four Western Provinces, particularly in Alberta. Extension from wild predators to domestic animals followed, necessitating rather far-reaching restrictive measures on dogs in the areas involved. Control measures included mass vaccination of dogs, and to a lesser extent cats, and a very comprehensive programme of poisoning, trapping, and shooting predatory wild life.

During the year under review the necessity of employing substantial numbers of departmental veterinarians for lengthy periods in connection with the outbreaks of foot-and-mouth disease and rabies has resulted in slowing up, to some extent, the eradication of bovine tuberculosis; but the Federal-Provincial programme for the control of bovine brucellosis by means of calfhood vaccination with *Brucella abortus* Strain 19 continued to prosper. Upwards of 1,000,000 potential breeding females have now been protected by this vaccine, and these animals are eligible for entry into the United States without blood test for brucellosis for a period of 22 months following vaccination.

The present staff of the Health of Animals Division numbers 1,222, all categories included. While appointments of full-time veterinarians during the year under review exceeded resignations by six, 15 of the resignations were of comparatively young men with a few years' service. This situation is reflected in the difficulty of finding suitable and sufficiently experienced officers to fill positions of even minor responsibility, and the opinion is expressed that the quality of service rendered by the Division can be expected to deteriorate.

F. W.

REVIEW

[L'Elevage au Soudan Francais, son Economie. G. Doutressoulle. Pp. 374. Illustrated. Alger: E. Imbert. No price stated.]

This delightful book deals with the livestock and the livestock industry of French West Africa. Written by G. Doutressoulle, former Inspector General of Veterinary Services, it is the result of knowledge gained by the members of the veterinary service during the course of years, and is an excellent example of the wisdom of putting veterinarians in charge of animal husbandry.

All phases of the livestock industry are described, such as the various breeds and their distribution, methods of management, feeding, seasonal migrations, water supplies and methods of construction and care of wells, livestock routes from the French territories to the Gold Coast, Nigeria, Dakar, etc., control of infectious diseases, and methods which are being adopted to develop and improve the industry.

It is divided into seven parts under the headings: (1) Importance and general character of the livestock industry. (2) The breeding zones. (3) The livestock industry including cattle, sheep and goats, horses, asses and camels. (4) Trade in livestock and their products. (5) Methods for improvement of livestock. (6) Agriculture and livestock and (7) The future of the industry.

There are numerous excellent photographs of the different breeds of livestock—some of these breeds are of a very good type. Other photographs are of flocks and herds grazing, watering, or *en route* to markets or to the seasonal grazing grounds.

A very special feature is the numerous beautiful line drawings by Camille Leroy. These are of very high artistic merit, imbued with life, and sometimes with an engaging suspicion of humour. Even more than the excellent photographs they enable the reader to get some understanding of the atmosphere of these remote parts of the world and of the background against which the veterinary work has been accomplished.

Nothing on the lines of this book has been produced from the British territories in Africa. It can be very highly recommended, not only to members of the Colonial Veterinary Service but to anyone interested in livestock.

SWEDISH VETERINARIAN

A Swedish veterinarian would like to effect an exchange visit with a British veterinary surgeon this summer. He would like to visit him for a fortnight in July or September and to offer a fortnight's hospitality in Sweden in return. Any member who is interested in this proposition is asked to write direct to District Veterinarian H. Sandstedt, Mjolby, Sweden, who is the gentleman in question.

QUESTIONS IN PARLIAMENT

Slaughtering Facilities

Mr. Hurd (March 9th) asked the Minister of Food what progress is being made in providing adequate slaughtering facilities when the butchering trade is returned to private hands in July.

Major Lloyd George: All local authorities have been asked to consult organisations representing farmers and meat traders in their districts to ascertain what slaughtering facilities will be needed on decontrol. In view of the urgency of the problem I have discussed with representatives of the associations of local authorities the special measures which have to be taken for the licensing and provision of slaughterhouses, and I am shortly sending a general letter of guidance to all local authorities.

Warble Fly

Mr. Hurd (March 11th) asked the Minister of Agriculture what arrangements have been made for treating cattle found to be infested with warbles at the ports and markets; and if he will give an assurance that investigations into the possibility of immunising cattle are being pressed ahead.

Mr. Nugent: No arrangements are made to treat cattle at ports or markets in this country. So far as Irish cattle are concerned, an order in Northern Ireland requires visibly infested cattle to be dressed, while cattle from the Irish Republic are dressed at the ports of embarkation. My right hon. Friend is considering whether any improvement on these arrangements is possible. As to the second part of the Question, I can give my hon. Friend the assurance he seeks.

NOTES AND NEWS

Diary of Events

Mar. 20th.—Annual General Meeting of the Biochemical Society in the Department of Chemistry, University College, Gower Street, London, W.C.1, 10.45 a.m.

Mar. 24th.—Meeting of the North Wales Division, B.V.A., at the Council Chambers, Ruthin, 2 p.m.

Mar. 24th.—Ordinary General Meeting of the South Eastern Division, B.V.A., at the Royal Star Hotel, Maidstone, 2.30 p.m.

Mar. 24th.—Meeting of the South-East Midlands Division, B.V.A., at Franklins Gardens Hotel, Northampton, 7 p.m.

Mar. 25th.—V.V.B.F. Ladies' Guild: North of Scotland Division, B.V.A., Annual Dance, Aberdeen.

Mar. 25th.—Annual General Meeting of the Western Counties Division, B.V.A., at the Imperial Hotel, Exeter, 11 a.m.

Mar. 25th.—Spring Meeting of the North of Scotland Division, B.V.A., in the Northern Hotel, Aberdeen, 2.30 p.m.

Mar. 26th.—Annual Dinner and Dance of the Yorkshire Division, B.V.A., at the Parkway Rooms, South side entrance to the Parkway Hotel, Bramhope, Leeds, 7 p.m.

Mar. 31st.—Meeting of the Technical Development Sub-committee on the Calf Report, 7, Mansfield Street, W.1, 11 a.m.

Apr. 1st.—Meeting of the Technical Development Committee, B.V.A., at 7, Mansfield Street, W.1, 10.30 a.m.

Apr. 2nd.—Joint Ordinary General Meeting of the A.V.T. and R.W. at the Royal Veterinary College, Camden Town, N.W.1, 10 a.m.

Apr. 3rd.—Annual Dinner of the B.R.X. Club at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

Apr. 7th.—Ordinary Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region) in the Department of Veterinary Pathology, Bedford Street North, Liverpool, 7, at 10.30 a.m.

Apr. 10th.—Reunion Dinner of the R.V.C. '52 Club at "Ye Miller of Mansfield," Streatley, 7.30 p.m.

Sept. 19th—25th.—72nd Annual General Meeting and Congress of the British Veterinary Association at Torquay.

B.V.A. Council and Committee Meetings at the University of Glasgow

Monday, April 12th

10.30 a.m. Veterinary State Medicine Committee.
2.15 p.m. Home Appointments Committee.
3.30 p.m. Parliamentary and Public Relations Committee.

Tuesday, April 13th

10.30 a.m. Organising Committee.
1.45 p.m. General Purposes and Finance Committee.

Wednesday, April 14th

10.0 a.m. Council Meeting.

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PERSONAL

Births.—Hamilton.—On March 5th, 1954, at Hazelwell Nursing Home, to Carmen Teresa (*née* Fryer), wife of H. A. Hamilton, M.R.C.V.S., of 38, Ascot Road, Moseley, a son—Charles Richard.

Roberts.—On March 10th, 1954, at Masons Hill Maternity Home, Bromley, Kent, to Dorothy (*née* Cradduck), wife of H. G. Roberts, M.R.C.V.S., a daughter—Sandra Christine.

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Marriages.—Highet—Callaghan.—The marriage took place on Tuesday, March 2nd, at St. Luke's Church, Crosby, Liverpool, 23, between Donald R. Highet, M.R.C.V.S., of Liverpool, and Jean I. Callaghan, of Crosby. Mr. J. Kidd, M.R.C.V.S., was the best man.

Reid—Collier.—The wedding took place on February 20th, 1954, at St. Martin's Church, Acton, between John H. Reid, M.R.C.V.S., younger son of Mr. D. T. Reid, M.R.C.V.S., and Mrs. Reid, of Glasgow, and Beryl Maureen Collier, only daughter of Mr. and Mrs. F. Collier, of Acton.

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Dr. James Carmichael, C.M.G., M.R.C.V.S., is relinquishing the post of Head of the Veterinary Research Division of Messrs. May & Baker Ltd. on March 31st next. He will, however, retain his connection with the M. & B. organisation as Veterinary Research Consultant and his private address will be Boarded Barns Farm, Ongar, Essex.

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Dr. H. W. Marett Tims

A Personal Tribute

Many members of the profession who were students at the London School during the first two decades of this century will hear with regret of the passing of Henry Marett Tims, who was their Professor of Biology. He was appointed in 1906 and held the post until he was called to serve in the R.A.M.C. during World War I. He died in a nursing home at Farnham on March 4th a few days before his 91st birthday.

Professor Tims was a great teacher. He was able to put the most abstruse scientific facts into language that all could understand; and further, like the great teachers of the past, he did not require a whole armamentarium of expensive and elaborate equipment at his elbow. He had a great sense of humour and sarcasm, but he would never use this to hurt. Students went willingly to his lectures and demonstrations and enjoyed them. His task was of greater difficulty than that of his counterpart of modern days for it must be remembered that 99 per cent. of his pupils came to the college completely ignorant of the mysteries of the zoological world.

In those days the students had to provide their own microscopes, and at the beginning of the winter term the instruments had to be submitted for his approval. I well remember the occasion when my class went through this ordeal. An extraordinary collection of instruments was produced, culled from relatives, second-hand shops and even from pawnbrokers, and many could be classed as sentimental mementoes of a bygone age. Some were so big that one could scarcely carry them, whilst others were not much better than a pocket spy glass. In our ignorance we thought that their merit was proportionate to their size, and one

man, who had an instrument which would have been more suitable for astronomical adventures, strutted about with great nonchalance and confidence in the majesty and efficiency of his machine. Dr. Tims appeared to be thrilled. He traced its history and eulogised on its great mechanical virtues. He must have played with it for at least a quarter of an hour during which time its proud owner preened himself in front of us and to our great envy. Then suddenly the bubble was burst. The professor told him that it was no use as an aid to his biological studies but the South Kensington museum would give a lot of money for it!

Dr. Tims was born in Calcutta in 1863. His father was Dr. T. Lamb Tims. He was educated at Reading and at Cambridge and Edinburgh Universities. He pursued his medical studies at St. Thomas's Hospital and at Strasbourg. He held house appointments in Edinburgh and at the Children's Hospital, Great Ormond Street, and he served for five years at the Blackfriars Hospital for skin diseases. He then turned to biology and comparative anatomy, and was a lecturer at the Westminster and Charing Cross Medical Schools. Later he was Demonstrator of Human Morphology at Cambridge, Reader in Zoology and Comparative Anatomy at Bedford College in the University of London, and Lecturer on Comparative Anatomy and Physiology at the Royal Dental Hospital.

He published many scientific papers and edited the seventh and eighth editions of "Tomes Dental Anatomy," a classic on that subject.

Other notable contributions to literature were "On the Origin of the Mammalian Teeth," *T.O.S.*, March 28th, 1896; "Notes on the Dentition of the Dog," *Anat. Anz.* **11.** 1896, and "On the Tooth Genesis in the Canidae," *J. L. Soc.* (*Zoo*) **25.** 1896.

He served in Great War I, attained the rank of Lieut.-Colonel and was awarded the O.B.E.

J. McC.

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John Going, M.R.C.V.S.

A Personal Tribute

I knew John Going in the last phase of his life at the greyhound kennels at Northaw and, as his colleague, worked in the closest association with him for 19 months.

I soon came to realise that under an exterior which was occasionally rough and impatient there was a heart of gold and an absolute integrity which was commoner in his generation than it is to-day. He was utterly incapable of any meanness or subservience, and nothing could prevent him from doing his duty in the light in which he saw it. It can truly be said about him—as Chesterton said about Bernard Shaw—that he was "an Irishman, and therefore an aristocrat."

Let us also remember with sympathy his wife, who in her modest way was such a splendid and inseparable companion for him in his last years.

A. L. B.

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GENERAL OBITUARY

Dr. Leo F. Rettger

We have learned with deep regret of the death of Dr. Leo F. Rettger who was found dead in the garage of his home in New Haven, Connecticut, on January 7th, 1954. Dr. Rettger discovered the causative organism of pullorum disease of poultry, and subsequently collaborated in developing the agglutination test which is the basis for the control of the disease. He was Professor of Bacteriology at Yale University for many years and in addition to his pullorum research he wrote many scientific articles; the payments he received for the latter he used for practical work and the setting up of fellowships at Yale University.

NATIONAL COUNCIL FOR DOMESTIC FOOD PRODUCTION

The National Council for Domestic Food Production, which was initially established for a period of three years, has been re-appointed by Sir Thomas Dugdale for a further similar period.

The Minister has invited Miss J. O. Joshua, F.R.C.V.S., who has served on the Council since its inception, to continue during this renewed term.

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FELLOWSHIP FOR DR. J. A. LAING

Dr. J. A. Laing, Senior Lecturer in Veterinary Medicine in the University of Bristol, has been awarded a Fellowship from the Churchill Endowment Fund to work at the University of Copenhagen in the Royal Veterinary and Agricultural College. He will spend six months in Denmark from April to October this year studying Danish agriculture generally and methods of animal breeding and livestock improvement particularly.

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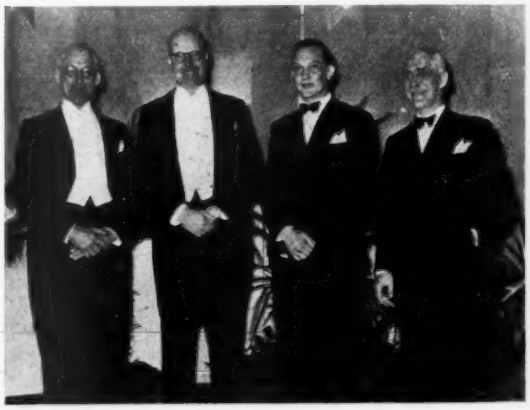
LIVERPOOL UNIVERSITY VETERINARY SOCIETY

Annual Ball

The Annual Ball of the Liverpool University Veterinary Society was held at the University on Friday, February 26th. More than 300 people were present, the students acting as hosts to most of the staff of the Faculty, and to a number of veterinary surgeons from the surrounding area. The high standard of organisation and decoration which has been associated with this event over the past years was again evident. The "motif" of the decorations throughout was Chinese, and particularly noteworthy was a willow-pattern tableau at one side of the ballroom. All signs and directions were written in Chinese, but fortunately for those who do not speak the language, English translations were appended.



[*Photo: Simpsons, Liverpool.*

Professors R. E. Glover and E. G. White, Mr. W. D. Tavernor (Student President) and Professor J. G. Wright.

The veterinary atmosphere was introduced by an exhibition of high-school horsemanship in the ballroom by Mr. Harry Monks with his horse Golden Jap. This versatile exhibition in the unusual setting was much appreciated once it was established that the special crêpe-rubber shoes gave an adequate grip on the ballroom floor.

Dancing continued until 2 a.m. when even the discovery that snow had fallen heavily during the evening did not spoil the enjoyment of a memorable occasion. The students are to be congratulated and thanked for providing an annual event which is anticipated with pleasure by many members of the profession in the area.

R. M. L.

SMALL-ANIMAL PROBLEMS

Members will probably have seen in the Supplement to this week's issue of *The Veterinary Record* that the Technical Development Committee has been enlarged by the alteration of a by-law on a special resolution of the Council. Six extra members with a particular interest in small-animal problems have been appointed, and at a special meeting of the whole Committee it was decided to make a survey of the incidence and distribution of disease in small animals throughout the country.

The Committee would be glad if members would help in this work by notifying *the General Secretary, B.V.A., 7, Mansfield Street, Portland Place, London,* of the SIX most important diseases or conditions seen in their own practices—in order of importance if possible—indicating whether the importance is due to the number of animals affected or to the high rate of mortality.

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SECOND INTERNATIONAL CONVENTION OF PHYSICIANS AND SURGEONS

At the Second International Convention of Physicians and Surgeons, which is being held in Turin at the beginning of June, Mr. Gordon Knight, F.R.C.V.S., of the Royal Veterinary College, is to address the meeting on Veterinary Medicine. He will be showing some of the films which he has prepared in connection with small-animal surgery.

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THE BRITISH CARIBBEAN VETERINARY ASSOCIATION

The Trinidad Branch of the British Caribbean Veterinary Association is holding a convention meeting in Trinidad, B.W.I., during the week May 24th to 29th, 1954.

The meeting will comprise two days of scientific sessions, two days of clinical demonstrations in both large and small animals, and two days of field and social excursions. Arrangements are now being completed to secure the services of overseas specialists both as speakers and clinicians.

The Association is most desirous of having as many overseas visitors as possible and a very cordial invitation is extended to all veterinary surgeons in the United Kingdom. It is hoped that a fair number will find it possible to attend.

Trinidad may be reached by British Overseas Airways, which provides a twice-weekly flight from London Airport. In addition, frequent sea communication is offered both by Messrs. Elders & Fyffes and the Cie. Generale Transatlantique.

The Secretary of the Association, Dr. Holman E. Williams, Department of Agriculture, Trinidad, will be very willing to supply any further information on request.

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CATTLE DEVELOPMENT PLAN FOR BECHUANALAND

The report of the mission under the chairmanship of Mr. Arthur Gaitskell, which went to the Bechuanaland Protectorate in November, 1952, to investigate the possibilities of economic development in the western part of the Kalahari Desert, has now been published.* During the five weeks which the members of the Mission spent in the area they travelled about 2,000 miles and, as a result of their investigations, they came to the conclusion that much of the region could, as pasture, compare reasonably with many beef ranching areas in the world. They considered that its potentialities for large-scale cattle development should be put to the test by the establishment of a pilot ranching project and by immediate investigation of water supplies.

In a foreword to the report it is stated that the Secretary of State for Commonwealth Relations has signified his agreement with the Mission's findings, and that surveys of existing farms in the area, and of water supplies, have already been put in hand.

The Protectorate's present cattle population is about 1,000,000 (compared with a human population of roughly 250,000), and it already exports cattle on a considerable scale to neighbouring territories. In the area investigated by the Mission there are 50,000,000 acres of idle grassland, so that, even assuming the average carrying capacity to be no more than one beast to 50 acres, development of the region for cattle would mean the addition of 1,000,000 head to the world's population and of between 40,000 and 50,000 tons of meat a year to the food supplies of the Commonwealth.

The Mission's most striking impression of the Western Kalahari region was that it is not desert, in the sense that the Sahara is, but rather an endless panorama of grass and bush growing in a mantle of sand. The soil is not suitable for crops, but can provide excellent grazing. Country immediately adjacent, across the borders of the Union and of South-West Africa, is already being developed, and even within the Kalahari itself good cattle have been produced both by Europeans and Africans without capital or scientific management or help of any kind. For all these reasons—allied to the fact that there is an urgent demand for meat in the world generally and in Southern Africa in particular—the Mission felt that there were good grounds for going ahead with a scheme of cattle development.

There are, of course, obstacles. The principal one is the lack of water. Surface water does not exist at all, except in pools for a short time after rain—which is itself sporadic and uncertain. However, some success has already been met with in tapping underground water supplies. Another difficulty is the remoteness of the area, the long and difficult journeys the stock would have to make to reach markets, and the human isolation which would be inseparable from a ranching life in the region. Nevertheless, the report points out, "all these drawbacks have been encountered wherever ranching has been started in the world, and . . . throughout history, in the new worlds as well as in South Africa, ranching has been man's natural way of pioneering."

Development by Partnership

The report goes on to examine different methods by which development could be effected. The Mission were asked, in their terms of reference, to consider two alternatives: the establishment of a large-scale ranch, or the expansion of the cattle-carrying capacity of the area by the establishment in it of individual cattle farmers, both European and African, who would be helped by the Bechuanaland Administration and by the Colonial Development Corporation or its associates. They favoured the second method and suggested it should take the form of a three-fold partnership, "the Government providing the land, the survey and the main roads, the Colonial Development Corporation (or another agency financed by the Corporation) undertaking the management, providing the initial water supplies, the external fencing, the loans to assist, and the staff to control and help, the third partner, who would be the individual ranchers."

At the end of an appropriate period, when the Colonial Development Corporation had recovered its capital, the partnership could be easily converted, the report suggests, into a co-operative ranching project, for which the period of partnership could be a continuous preparation.

In the Mission's summing up and recommendations it is suggested that a pilot project be started immediately in the Ghanzi area, in the north-west of the Protectorate, near the border of South-West Africa. Here there are known water supplies, good pasture, a healthy climate, and an existing cattle population. The area to be developed first should be 40,000 acres, to be extended later to 120,000. It should be Crown land, made available by the Government. The managing company, with representatives on its board of all interests in the partnership, should finance and manage the pilot farm, which would be regarded as a testing ground and would have a breeding policy biased towards indigenous African stock. Running expenses and interest on capital would be covered by the sale of the products, while capital expenditure would be repaid by the Government on the termination of the managing company's interests after a given period of years.

It is recommended that a committee of Africans and Europeans should choose the site and the staff and plan the organisation of the pilot farm, and should review the project annually. Five years after the start of the pilot farm the first ranch units of new development should be open for application.

The Mission urge that the position of European and African farmers already resident in the Kalahari should be investigated so as to give them greater security and incentive, and at the same

* Report of a Mission to the Bechuanaland Protectorate to investigate the possibilities of economic development in the Western Kalahari. 1952. Published by H.M.S.O., price 15s.

time to exercise greater control over their activities. If they wished at some later date to join the ranching scheme they should be admitted, but membership of the scheme should be compulsory only in the new development areas.

It is recommended that roads should be made as soon as possible and a water survey of the region should be carried out, giving priority to the existing trans-Kalahari cattle-routes.

Finally, the report recommends that allocation of ranches should be made, by a selection board of the partnership, to African or European without any particular separation of areas. "We believe and hope that a Kalahari Ranching Partnership, by bringing together European and African in a common economic interest, may, with tolerance and good management, provide a sound and practical example, from which good will come."

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Ches.—West Bank Field, Marsh Farm, Frodsham Marshes, Frodsham (Mar. 10).
Denbigh.—Ty'R'Aer Fawr Farm, Bodfari (Mar. 8).
Dorset.—Sunnyside Farm, Halstock (Mar. 12).
Lanarks.—Overton Farm, Crossford, Carluke (Mar. 10).
Lancs.—Burholme, Dunsop Bridge, Clitheroe (Mar. 9).
Salop.—Burleydam Farm, Burleydam, Whitchurch (Mar. 12).
Wilts.—Green Meadow Farm, Haydon Wick, Swindon (Mar. 8).
Yorks.—High Crankley Farm, Easingwold (Mar. 10).

FOWL PEST:

Berks.—The Phoenix, Netson Lane, Hurst, Reading (Mar. 13).
Cambs.—The Ferry and Church Farm, Isleham (Mar. 9); Stancroft, Pound Lane, Isleham (Mar. 11); 1, Bowens Lane, Isleham (Mar. 13).
Hunts.—Cot Farm, Abbotsley, St. Neots (Mar. 9).
Lancs.—Bannisters Farm, Much Hoole, Preston; 18a, Keighley Road, Laneshaw Bridge, Colne; Northfields Farm, Liverpool Road, Rufford, Ormskirk (Mar. 9); Gill Farm, Gill Lane, Longton, Preston (Mar. 10); Poultry Farm, and Chapel House Farm, Gill Lane, Longton (Mar. 11).
Lincs.—Crofton Holding, Aswarby, Sleaford (Mar. 8); 8, Alfred Avenue, Metheringham (Mar. 9); Hall Yard, Metheringham, Lincoln (Mar. 13).
Norfolk.—Dovehouse Farm, Tibenham, Norwich; Oak Farm, Bedingham (Mar. 12).
Suffolk.—Marsh Farm, Thrandeston (Mar. 13).
Surrey.—Anners Thorpe, Chertsey (Mar. 11).

SWINE FEVER:

Beds.—Manor Farm, Stagsden, Bedford (Mar. 9); Baldock Road Allotments, Stotfold, Arlesey (Mar. 10).
Berks.—"Iona," Breadcroft Lane, Woodlands Park, Maidenhead (Mar. 10).
Cambs.—Holly Tree Farm, Sun Street, Isleham (Mar. 8); Shelford Bottom, Gt. Shelford (Mar. 12).
Ches.—Oak Farm, Dodds Bank, Shavington, Crewe (Mar. 9); 16, Marston Lane, Marston, Northwich; Docwries Farm, Barrington Road, Shepreth, Royston (Mar. 10).
Essex.—The Bungalow, Common Lane, Thundersley (Mar. 8); Dynes Farm, Debden, Saffron Walden (Mar. 9).
Flints.—Shepherd's Farm, West View, Saltney, Chester (Mar. 9).
Glouc.s.—Twigworth Court, Twigworth (Mar. 8).
Herts.—The Manor Farm, High Street, Broxbourne (Mar. 8).
Hunts.—Mill Farm, Low Road, Fenstanton (Mar. 10).
Lancs.—Penketh Hall Farm, Penketh, Warrington (Mar. 13).
Leics.—Grange Farm, Ashby Folville, Melton Mowbray (Mar. 9).
Lincs.—Moor Farm, Branston, Grantham (Mar. 9); 225, Holding, Sutton Marsh, Spalding (Mar. 11).
Norfolk.—"Marshlands," Lynn Road, Terrington St. Clement, King's Lynn (Mar. 8); Ash Tree Farm, Saham Hills, Thetford (Mar. 13).
Salop.—Fields Farm, Onneley, Crewe (Mar. 8); Park Farm, Yockleton, Shrewsbury; New Park House, Whittington Road, Oswestry (Mar. 12).
Staffs.—The Hollies, Main Street, Snarestone, Burton-on-Trent (Mar. 9).
Suffolk.—Bus Creek Allotments, Southwold (Mar. 9).
Worcs.—Holly Farm, Whitepits Lane, Portway, Birmingham (Mar. 12).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

INFECTION WITH *FILAROIDES OSLERI*

Sir,—With respect to the recent paper by Urquhart, Jarrett and O'Sullivan dealing with *Filaroides osleri* infection, I notice that the latest reference consulted was a paper by Pillars in 1935 and thought that these authors might care to have their attention drawn to more recent references. E. C. Dougherty, of the Zoology Department, University of California, has, for some years past, been publishing a series of papers dealing with the different genera and species of helminths parasitising the respiratory system of various animals, many of these papers having appeared in *The Proceedings of the Helminthological Society of Washington*. In 1943 he published in this journal a paper entitled "The Genus *Filaroides* van Beneden, 1858, and Its Relatives: Preliminary Note." In it he comments that *Filaroides* genus includes forms which have undergone almost complete loss of the typical strongyline bursa and because of this reduction the species of this genus "have had a long history of incorrect allocation to the suborder Spirurina, in which they have been classified in both the super-family Filaroidea Weinland, 1858, and the super-family Spiruroidea Railliet and Henry, 1915." Later in this paper he says: "I believe that *Filaroides* and *Metathelazia* are, on the other hand, most closely related to the genus *Aelurostrongylus* Cameron, 1927. This view is based on several facts." These he sets forth, and included amongst them is the statement that "species of both genera employ terrestrial gasterpods (snails and slugs) as intermediate hosts, as Petrov and Gagarin have shown for *F. martis* (Werner, 1782), comb. nov. (syn. *F. bronchialis*), and Wetzel for *A. falciformis*."

In a later paper dealing with the genus *Aelurostrongylus* (1946) Dougherty again discusses the systematic position of *Filaroides* and concludes that the sub-family Filaroidinae skriabin, 1933, of the family Metastrongylidae Leiper, 1909, has six genera including *Filaroides* v. Beneden, 1858 (genotype; seven species).

I have been interested in this parasite for several years and, so far as I am aware, the life cycle remains unknown. In 1936, when a typical case of *Filaroides* infection was available, I fed several hundred larvae that had been kept alive for 10 days to a dog which was killed about four months later and examined *post-mortem*. At autopsy there was no evidence of *Filaroides* infection. It seemed to me inexpedient to publish the result of this experiment based on a single animal and to make from it any deductions regarding the nature of the life cycle.—Yours faithfully, J. N. OLDHAM, Division of Parasitology, Department of Pathology, Royal Veterinary College, London, N.W.1. *March 9th*, 1954.

REFERENCES

DOUGHERTY, E. C. (1943). *Proc. Helminth. Soc. Wash.* **10** (2). 69-74.
——. (1946). *Ibid.* **13** (1). 16-25.
——. (1946). *Ibid.* **13** (1). 25-26.

Sir,—In this practice several cases of canine tracheo-bronchitis due to *Filaroides osleri* are encountered each year. So far the best line of treatment has been the intramuscular injection of 1 to 2 c.c. anthiomaline at three-day intervals until three injections have been given.

Unfortunately this treatment causes severe depression in most of the patients and recently I have tried oral dosing with Banocide, but results have not been consistently good.

I should be very interested to learn of the experiences of other practitioners who have these cases to deal with.—Yours faithfully, H. FORSYTH, Lechlade, Glos. *March 8th*, 1954.

SOME ODDITIES

Sir,—The following cases are noted, not because they have any particular scientific interest or application, but merely as a series of odd occurrences which have come to the writer's notice *on one farm* over a period of some 20 years.

1. A doe rabbit, believed not to be " in kindle " after service. A buck was introduced into the hutch and mating occurred. The next day eight full-time, normal rabbits were born, and a month later a further six. The latter evidently resulted from the service accepted 24 hours before delivery of the first litter.

2. A cart mare, multiparous. A regular breeder, but invariably came into season in the autumn while pregnant. In the year in question, however, after her usual autumn diversion, she gave a picture, in the following spring, of a typical phantom pregnancy: waxing, running milk, going into the corner of the field where she usually foaled, even lying down and straining. After all this she got up and continued grazing, not having been in foal at all.

3. A Jersey heifer, struck by lightning as a yearling, which left her paretic. Service was possible and conception took place at the first service. The gestation period extended to 373 days and a live heifer calf was born which is now in the herd. (This case was, I believe, confirmed by the Royal Veterinary College authorities at Streatley.)

4. A Jersey heifer, one and a half years; oestrus regular but failed to conceive. No clinical abnormality being palpable, a corpus luteum was expressed, in the hope that conception would result from service in a broken and re-established cycle. In 10 days the heifer was a roaring nymphomaniac and 10 days later was in full milk.

5. A Jersey heifer, rising two years. She was examined at full term as the owner was doubtful whether she was in calf. A mummified foetus was diagnosed. As the owner still hoped delivery might occur naturally (*vide* Case 3 *supra*) no steps were taken. The heifer came into oestrus three weeks later and a further examination showed the foetus to be still *in utero*. Stilboestrol 100 mg. was administered and it was possible to deliver the foetus 48 hours later. One has, of course, seen many cases where oestrus was resumed in spite of a small foetus being retained in the vagina, but I have never before seen oestrus occur where there was a dead foetus present in the uterus.

6. A white Shorthorn cow, four years old, due to come down with her second calf and udder springing. Calving apparently commenced but made no progress. Examination revealed a complete occlusion of the vagina some 3 inches inside the vulva. On rupturing this an enormous quantity of fluid, estimated at upwards of 25 gallons, gushed out. There was no evidence of a foetus. It is assumed that service must have reopened some vaginal injury which occurred at her first calving, with a subsequent healing together. But why should an apparently typical case of " white-heifer disease " occur *after* one normal calving?—Yours faithfully, P. Crosfield, Chipping Norton, Oxon.

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THE R.A.V.C. AND MALAYA

Sir,—My copy of *The Veterinary Record* of January 9th reached me only a few days ago and I read with pleasure of the widespread activities of the R.A.V.C. in the last war, despite the mechanisation of the Army in general.

However, I must join issue with the writer of the article as regards the R.A.V.C. in Malaya. As far as I am aware there was no R.A.V.C. personnel in Malaya before the Japanese attack in December, 1941; I certainly did not meet or hear of any. The ordinary civil Malayan Veterinary Department handled all livestock matters for both the civil population and the Army. In Singapore the Veterinary Officer, Singapore, dealt direct with the A.D.S. & T. at Army Command H.Q. there (mainly in connection with the supply of goats for food for the Indian troops), and about August or September, 1941, General Percival met the Local Veterinary Officer on a visit to Penang and discussed with him the quarantine arrangements for goats to be imported from India for the Indian troops.

As regards the 17,000 head of cattle imported from the N.E.I. —from Bali and Lombok—these animals were selected and purchased by the Veterinary Officer, Singapore, from the quarantine stations after importation by local firms normally engaged in this traffic who had been instructed to obtain extra animals for this purpose. It was understood at the time that this was one part of the Civil Defence Scheme; it may, of course, have been from an Army directive in the first place. Purchasing of cattle commenced, I think, early in 1941, and continued at least until November of that year. On release from quarantine the cattle were sent up country by train to the various civil Veterinary Officers who arranged and controlled their dispersion, and, as I heard afterwards, it was some of these same Veterinary Officers who herded (or were responsible for herding) as many of the cattle as possible back towards Singapore in front of the Japanese advance down Malaya.

By the end of 1945 several officers of the R.A.V.C. were included in the Army of reoccupation, as were four of the five old civil Veterinary Officers who had not been interned by the Japanese. Some of these R.A.V.C. officers stayed on after civil government was resumed and three of them joined the Malayan Veterinary Department or the Municipal Department.—Yours faithfully, R. A. B. Stanhope (late of the Malayan Veterinary Department), 118, Williams Road, Kalamunda, West Australia. *March 1st*, 1954.

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FODDER-BEET POISONING IN CATTLE

Sir,—I have been interested in the recent literature reported in the *Record* on fodder-beet poisoning and would like to relate an experience of this condition.

On January 21st this year I was called to see two Friesian cows suspected of suffering from fodder-beet poisoning. On arrival I found that fodder-beet had recently been introduced into the feed. One cow was lying down and was unable to rise; it appeared dull and depressed, there was marked diarrhoea and the temperature was 100·5° F. This cow was given calcium borogluconate subcutaneously. The second cow was standing and had a temperature of 102° F., a normal pulse rate and foetid diarrhoea and anorexia. Both cows were given a mixture of catechu kaolin and stomachics.

Four hours later a second visit was made. The cow that had been down was standing up, it was very much brighter and had been moved to a loose-box, but the second cow was down and could not rise. This cow was then given calcium borogluconate intravenously and got up within 15 minutes of the injection. Both cows were eating hay next morning and subsequently made an uneventful recovery.

Although I realise this was only a mild form of fodder-beet poisoning, the response to calcium injections was similar to that expected in a normal milk fever.—Yours faithfully, E. L. Price, The Surgery, 12, Talbot Street, Ellesmere, Shropshire. *March 9th*, 1954.

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" CUTTING " IN HORSES

Sir,—In answer to Mr. Carey Foster's query in his letter published in *The Veterinary Record* of February 27th, I did in fact refer to " brushing " or " cutting " as it occurs during trotting.

Regarding the over-reach, David Roberge gives a method of preventing this in considerable detail, but as his practice was conducted in large cities in the horse age I presume he worked mostly on carriage horses and treated these cases as they occurred during trotting. Briefly, his method—for which he states his reasons—based on sound lines regarding the mechanism and *timing* of the movements of the feet, is to shorten the toe and round off the front of the shoe on the forefeet, *i.e.*, a roller shoe, and to lengthen the toe of the hind feet. The conformation of the horse has to be taken into consideration, but in most cases the above treatment will effect a cure at once.—Yours faithfully, G. S. Muir, 15, Temple Road, Stowmarket, Suffolk. *March 8th*, 1954.